

REMARKS

Favorable reconsideration of this application is respectfully requested.

Claims 1-8 are pending in this application. Claims 1-8 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. 2003/0122543 to Shirakawa in view of WO 2004/079340 to Hariharan et al. (herein "Hariharan"). That rejection is traversed as now discussed.

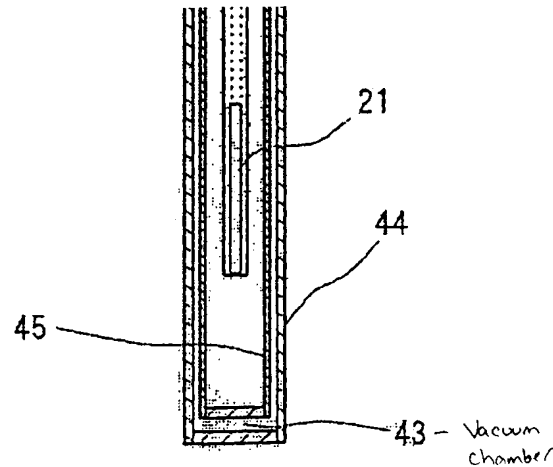
Applicant submits the claims as currently written positively recite features neither taught nor suggested by the applied art, as not fully recognized in the Office Action.

First, applicant notes independent claim 1 recites:

wherein the pipe is formed, sequentially from top to bottom, of an upper supporting tube, a condensing tube, a lower tube and an outer tube ***adapted to form an insulated vacuum chamber between the outer and the lower inner tube***[.]  
[Emphasis added].

Applicant submits that feature distinguishes over the applied art.

The below figure reprints a portion of Figure 1 in the present specification with an annotation showing the formation of such a vacuum chamber 43 between the outer tube 44 and the lower inner tube 45.



Applicant submits the claimed structure clearly distinguishes over the applied art.

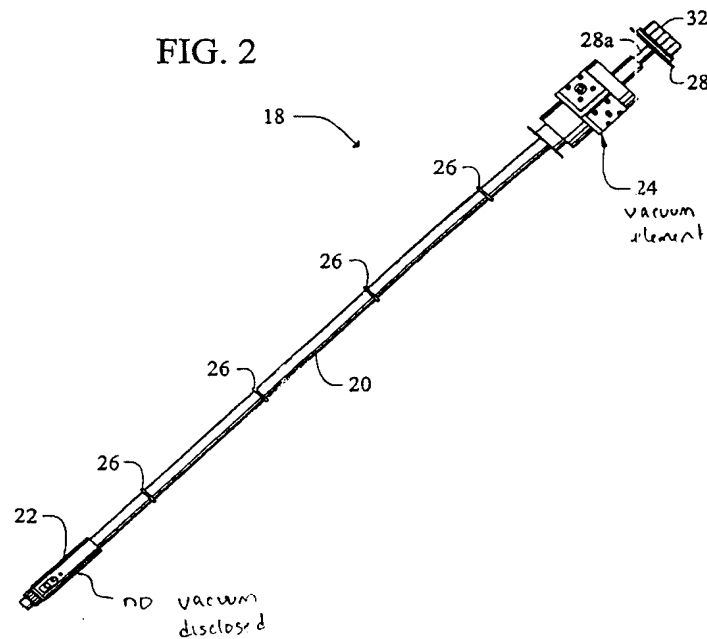
The outstanding rejections appear to cite Hariharan to disclose the above-noted features of a vacuum chamber, and the Office Action appears to specifically indicate Hariharan discloses a vacuum chamber between the cited outer tube 22 and the cited lower inner tube 44.<sup>1</sup> The grounds for the rejection also appear to emphasize the disclosures in Hariharan at page 17, third paragraph and page 5, third paragraph.

In reply to those grounds for rejection applicant submits the Office Action is misconstruing certain disclosures in Hariharan. The cited paragraph in Hariharan at page 17, third paragraph, is directed to a vacuum within the **aluminum housing 24** and is unrelated to the distal end housing 22 including the cited tubes 22 and 44. That is, applicant submits the cited elements 22 and 44 in Hariharan are part of a distal end housing 22, whereas the cited disclosures to the vacuum are directed to the aluminum housing 24. As shown in annotated

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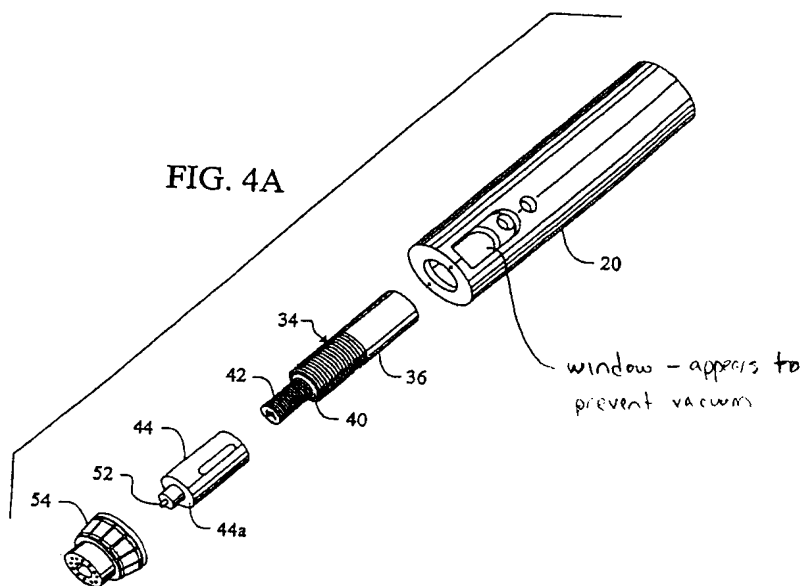
<sup>1</sup> Office Action of June 11, 2010, the bottom of page 3, the lines bridging pages 5 and 6, and middle of page 8.

Figure 2 of Hariharan below, Hariharan at most discloses forming a vacuum within the housing 24, but not within the distal end housing 22.



Applicant's arguments are not that Hariharan does not disclose any element including a vacuum, but that Hariharan does not disclose a vacuum between the cited outer tube 22 and the cited lower inner tube 44. No vacuum is disclosed between those two cited elements within Hariharan.

In that respect, applicant also draws attention to Figure 4a of Hariharan reprinted below with an annotation.



From the above-noted figure applicant submits element 22 in Hariharan includes a window, which would appear to prevent a vacuum.

Hariharan discloses a vacuum at most with respect to the aluminum housing 24, but not with respect to the element cited for the claimed upper tube and lower inner tube.

Hariharan does not disclose a vacuum between the cited upper tube 22 and the cited lower inner tube 44.

Thereby Applicant submits the above-noted claimed features distinguish over Hariharan.

Applicant also submits the applied art does not disclose or suggest the previously clarified claim feature of "the upper supporting tube and the lower inner tube are connected to each other through the condensing tube". Applicant submits Hariharan does not disclose the cited upper supporting tube 30 and the cited lower inner tube 44 being connected to each other through the cited condensing tube 20.

In that respect applicant submits Hariharan does not even disclose the cited element 20 operating as a condensing tube. A condensing tube is a tube in which a condensing operation occurs, and applicant submits Hariharan does not disclose or suggest any condensing operation being executed in the cited tube 20. Applicant below indicates the steps utilized in refrigeration in a condensing tube.

Steps of helium-3 refrigeration include (1) generate a ca. 1.5-kelvin space by pumping away the vapor from liquid helium-4; (2) helium-3 gas is liquified or “condensed” in a container held in the above space; (3) the evaporation of the liquid helium-3 by suction creates temperatures below 0.5 kelvin. In this evaporation, the helium-3 container is thermally insulated from the surrounding 1.5-kelvin space.

The condensing tube is called a “condensing tube” because that is where the condensing of the helium-3 gas occurs.

Turning to Hariharan, applicant submits Hariharan does not disclose any “condensing” operation, and thereby does not disclose condensing tube either. Applicants submit any apparent resemblance in structure between the claimed art and that of Hariharan is coincidental and the significant functions of the various parts are completely different. Applicant submits Hariharan does not disclose or suggest a counterpart of the claimed “condensing tube”.

Applicant also submits one of ordinary skill in the art would not consider a helium-3 refrigerator or the like from Hariharan since the device of Hariharan lacks essential parts such as vacuum thermal insulation from a 1.5-kelvin space and a condensing tube held at ca. 1.5 kelvin.

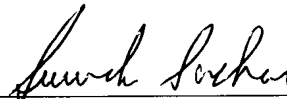
In view of these further foregoing comments, the further features of a “condensing tube” are believed to be neither taught nor suggested by the applied art.

In view of the foregoing comments applicant submits the claims as currently written positively recite features neither taught nor suggested by the applied art, and thus the claims as written are allowable over the applied art.

As no other issues are pending in this application, it is respectfully submitted this application is in condition for allowance, and it is hereby respectfully requested that this case be passed to issue.

Respectfully submitted,

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